

## REMARKS

Applicants gratefully acknowledge the March 24, 2004 telephone interview with Examiner Andrews wherein the issues raised in the December 5, 2003 Office Action were discussed in detail.

The December 5, 2003 telephone interview included a discussion of the restriction/election requirement which appears on pages 2-3 of the Office Action. Mr. Andrews informed the undersigned attorney that the guidelines used in making the restriction/election requirement are set forth in the MPEP's Administrative Instructions Under the PCT entitled "*Annex B Unity of Invention*".

Applicants have studied the Administrative Instructions governing unity of invention and believe unity of invention exists between the Group I composition claims 1-12 and the Group II method claims 14, 15 and 17-32 which were restricted by the examiner. The Group II claims were later cancelled. Therefore, new method claims 34-51 similar to the cancelled method claims have been added and reconsideration of the restriction requirement in view of the following remarks is respectfully requested.

Applicants respectfully submit that the criteria set forth in *Annex B Unity of Invention*, particularly in the "Examples" portion demonstrate that unity of invention exists between the composition claims of Group I and method claims 34 to 51.

In this regard, the examiner's attention is respectfully invited to Example 1 in the MPEP on page AI-67 which includes claim 1 for a method of manufacturing chemical substance "X", claim 2 for substance "X", and claim 3 for the use of substance "X" as an insecticide. Example 1 states that unity exists between claims 1, 2 and 3 because the special technical feature common to all claims is substance "X".

Similarly, in the subject patent application, Group I composition claims 1-12 and 33 recite a cover gas composition and claims 34-51 recite a method of protecting molten magnesium using the cover gas composition of Group I. The special technical feature common to the claims in Group I and claims 34-51 is the cover gas composition. Therefore, it is respectfully submitted that unity of invention exists. Accordingly, claims 34-51 should be included in the examination of this application.

Independent claims 1 and 5 have been amended to include the negative limitation "*non-trifluoromethane-containing*". Independent claims 1, 5 and 10 have also been amended to recite that the fluorine containing inhibiting agent includes "up to less than 1% by volume" of the composition. Independent claim 10 has also been amended to incorporate the limitations of claim 7.

Thus, independent claims 1, 5 and 10 expressly exclude trifluoromethane. Claims 1, 5 and 10 stipulate that the composition contain "up

to less than 1% by volume” of a fluorine-containing inhibiting agent. Support for the recitation of up to less than 1% by volume, can be found in the specification at page 3, lines 20-22 which state:

*“Preferably, the composition consists of less than 1% by volume inhibiting agent and the balance carrying gas.”*

The concept for the negative limitation “non-trifluoromethane-containing” is supported by the following passages in the specification:

Page 3, lines 29-31 states:

*“The inhibiting agent may be selected from the group consisting of hydrofluorocarbons (HFCs), hydrofluoroethers (HFEs) and mixtures thereof”*

Page 4, lines 1-4 states:

*“Suitable hydrofluorocarbons and hydrofluoroethers are listed in Table 1 below which includes their boiling points (BP) and their GWP’s...”*

Table 1 on page 5 is as follows:

TABLE 1

Chemical Name	Industry Name	Formula	GWP	BP
difluoromethane	HFC-32	CH <sub>2</sub> F <sub>2</sub>	580	-52°C
pentafluoroethane	HFC-125	C <sub>2</sub> HF <sub>5</sub>	3,200	-49°C
1,1,1,2-tetrafluoroethane	HFC-134a, R134a	C <sub>2</sub> H <sub>2</sub> F <sub>4</sub>	1,300	-26°C
difluoroethane	HFC-152a, R152a	C <sub>2</sub> H <sub>4</sub> F <sub>2</sub>	140	-27°C
heptafluoropropane	HFC-227ea	C <sub>3</sub> HF <sub>7</sub>	2,900	-17°C
methoxy-nonafluorobutane	HFE-7100	C <sub>4</sub> F <sub>9</sub> OCH <sub>3</sub>	480	61°C
ethoxy-nonafluorobutane	HFE-7200	C <sub>4</sub> F <sub>9</sub> OC <sub>2</sub> H <sub>5</sub>	90	78°C
dihydrodecafluoropentane	HFC-43-10-mee	C <sub>5</sub> H <sub>2</sub> F <sub>10</sub>	1,300	54°C

Thus, the specification discloses several species of hydrofluorocarbons and hydrofluoroethanes, in Table 1 on page 5 and in the Example on pages 7-13. Trifluoromethane is notably absent. The absence of trifluoromethane in the specification is believed to provide sufficient conceptual basis for the negative limitation “non-trifluoromethane containing cover gas composition”.

MPEP 2173.05 (i) “Negative Limitations” states in part:

*The current view of the courts is that there is nothing inherently ambiguous or uncertain about a negative limitation. So long as the boundaries of the patent protection sought are set forth definitely, albeit negatively, the claim complies with the requirements of 35 U.S.C. 112.*

*Note that a lack of literal basis in the specification for a negative limitation may not be sufficient to establish a prime facie case for lack of descriptive support. Ex parte Parks, 30 USPQ2d 1234, 1236 (Bd. Pat. App. & Inter. 1993).*

The examiner’s attention is also invited to MPEP 2163.02 which states in part:

*“The subject matter of the claim need not be described literally (i.e. using the same terms or in haec verba) in order for the disclosure to satisfy the description requirement.”*

The primary concern is whether there is support in the specification for the negative limitations in the claim, that is, whether the concept is present in the original disclosure. In re Anderson, 176 USPQ 331 (CCPA 1973). The patent law does not require that the phraseology in the

claim be identical to the language in the specification if a clear import of the meaning of the language can be found in the specification disclosure. Shaw v. Whiting Company, 163 USPQ 580; Kaiser Industries v. Jones and Laughlin, 181 USPQ 193 (1974).

The examiner's Interview Summary dated March 24, 2004 states that the expression "non-trifluoromethane-containing" is new matter because the specification is silent with respect to this expression. The examiner cites the decision of Ex Parte Grasselli et al, 231 USPQ 393 (PTO Board of Appeals 1986) as supporting his position. Applicants respectfully disagree.

The Grasselli decision does not state "the silence of a specification with respect to an expression makes it new matter". Rather, Grasselli held that negative limitations that introduce new concepts which did not appear in the specification as filed violate the description requirement of 35 USC 112 (at page 394). Applicants have shown that adequate conceptual support exists in the specification for the negative limitation "non-trifluoromethane-containing".

It is not necessary that the application describe the claim limitations in identical language, but only so clearly that persons of ordinary skill in the art will recognize those limitations from the disclosure. See In re Wertheim et al, 191 USPQ 90 (CCPA 1976), which states:

*“That what appellants’ claim as patentable to them is less than what they described as their invention is not conclusive if their specification also reasonably describes that which they do claim. Inventions are constantly made which turn out not to be patentable, and applicants frequently discover during the course of prosecution that only a part of what they invented and originally claimed is patentable... to rule otherwise would let form triumph over substance, substantially eliminating the right of an applicant to retreat to an otherwise patentable species merely because he erroneously thought he was the first with the species when he filed. Since the patent law provides for the amendment during prosecution of claims, as well as the specification supporting claims, 35 U.S.C. 132, it is clear that the reference to ‘particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention’ in the second paragraph 35 U.S.C. 112 does not prohibit the applicant from changing what ‘he regards as his invention.’*

It is also worthwhile to consider the following observation by

Judge Learned Hand:

*If, when (applicants) yield any part of what they originally believed to be their due, they substitute a new “invention,” only two courses will be open to them: they must at the outset either prophetically divine what the art contains, or they must lay down a barrage of claims, starting with the widest and proceeding by the successive incorporation of more and more detail until all combinations have been exhausted which can by any possibility succeed. The first is an impossible task; the second is a custom already more honored in the breach than in the observance, and its extension would only increase that surfeit of verbiage which has for long been the curse of*

*patent practice, and has done much to discredit it. It is impossible to imagine any public purpose which it could serve. Engineering Development Laboratories v. RCA, 68 USPQ 241-242 (CA2 1946), as quoted In re Driscoll, 195 USPQ 434, 438 (CCPA 1977).*

Should the examiner still maintain that the negative limitation “non-trifluoromethane-containing” is new matter, his attention is invited to MPEP 2163 III.A at page 2100-170, which sets forth the examiner’s obligations to support his position as follows:

*“The examiner has the initial burden of presenting by a preponderance of evidence why a person skilled in the art would not recognize in an applicant’s disclosure a description of the invention defined by the claims. Wertheim, 541 F.2d at 263, 191 USPQ at 197. In rejecting a claim, the examiner must set forth express findings of fact regarding the above analysis which support the lack of written description conclusion. These findings should:*

- (a) identify the claim limitation at issue; and*
- (b) establish a prime facie case by providing reasons why a person skilled in the art at the time the application was filed would not have recognized that the inventor was in possession of the invention as claimed in view of the disclosure of the application as filed.”*

Accordingly, applicants respectfully submit that the claims as amended are in full conformity with the requirements 35 U.S.C. §112.

Turning now to another issue, it should also be noted that the examiner did not acknowledge the Information Disclosure Statement (IDS) filed October 15, 2003 which cited Hungarian Patent document

HUP9900536A. The IDS also supplied its English equivalent, European Patent No. 094370082. Acknowledgment of the IDS is also requested.

With regard to the prior art relied upon by the examiner, the rejection of claims 1-8 and 10-12 and 33 under 35 USC 103 as unpatentable over PCT publication W096/22129 is respectfully traversed.

It is respectfully submitted that the proposed amendments to the claims now clearly distinguish the claimed composition over PCT Publication W096/22129. As already noted in the previous Amendment, applicants' claimed invention is a cover gas composition adapted for the protection of molten magnesium/magnesium alloy.

In contrast, WO 96/22129 is restricted to a fire extinguishing process and composition for Class A (trash, wood, or paper); Class B (flammable liquids or greases); and/or Class C (electrical equipment) fires (page 2, lines 12-22 and page 16, lines 7-12). There is no disclosure or suggestion in WO 96/22129 of a non-trifluoromethane-containing cover gas composition including up to less than 1% by volume of a fluorine containing inhibiting agent adapted to protect molten magnesium/magnesium alloy.

Moreover, those skilled in the art recognize the distinction between:

- (a) cover gas compositions for protecting molten magnesium/magnesium alloys, and



(b) fire extinguishing compositions.

Cover gas compositions used to protect flammable substances, such as molten magnesium/magnesium alloy differ from fire extinguishing compositions in three significant ways as follows:

1. Cover gas compositions contain a minimal amount of active inhibiting agent to prevent fires. Applicants' invention claims less than 1% by volume of the fluorine containing inhibiting agent. The use of such small amounts of active inhibiting agent is not simply an economic decision. In magnesium foundries, fluorine containing active agents form hydrogen fluoride (HF). The presence of hydrogen fluoride in a magnesium foundry is undesirable because large amounts of HF can cause severe corrosion to foundry equipment, including steel crucibles which contain molten magnesium.

It is known, for example, that cover gas compositions containing 2% by volume sulfur hexafluoride ( $\text{SF}_6$ ) have resulted in severe corrosion problems. Also, serious injury can result from  $\text{SF}_6$  reaction products with steel that can react explosively with molten magnesium. Applicants' cover gas composition contains less than 1% by volume of a fluorine containing inhibiting agent.

In contrast, fire extinguishing compositions contain significantly higher levels of active agent than applicants' cover gas composition. This is

because when a fire must be extinguished, the important and immediate concern is to put out the fire quickly. Accordingly, the greater amount of active agent in a fire extinguishing composition renders such compositions unsuitable as a cover gas composition because of the severe corrosion effect.

The examiner's attention is respectfully invited to Table C on page 31 of WO 96/22129 wherein the concentration of active fire extinguishing agent varies from 3 to 11.9 volume percent. Thus, the smallest concentration of fire extinguishing agent disclosed in WO 96/22129 is more than 300 volume percent greater than the fluorine containing inhibiting agent in applicants' claimed cover gas composition. See also page 30, lines 10-13 wherein the extinguishing composition is required to extinguish the fire in 30 seconds or less.

2. Cover gas compositions are used in the form of constant, small, quiescent flows of gas to prevent magnesium vaporization and subsequent combustion by producing a very thin surface layer or film on the molten magnesium/magnesium alloy that is impervious to magnesium vapor. The surface layer is on the order of 1 micrometer of magnesium oxide and magnesium fluoride. In contrast, fire extinguishing compositions are used after combustion occurs and are delivered in huge rushes of gas to extinguish a fire quickly.

3. Cover gas compositions are used at low pressures, for example 10-25% above atmospheric pressure. In contrast, fire extinguishing compositions are used at significantly greater pressure and are thus unsuitable as a cover gas composition.

The examiner's position is even more untenable in view of the examiner's admission that WO96/22129 does not disclose a cover gas composition for molten magnesium. See last two lines of page 3 of July 2, 2003 Office Action. Therefore, reconsideration and withdrawal of this ground of rejection is respectfully requested.

In response to the examiner's rejection on the top of page 5 of the Office Action that claims 10, 11 and 12 read on no inhibiting agent. Claims 10, 11 and 12 have been amended to recite that the composition includes "*up to less than 1% by volume*". Reconsideration and withdrawal of this ground of rejection is respectfully requested.

The rejection of claims 1-12 and 33 under 35 USC 103 as unpatentable over U.S. Patent No. 5,115,868 to Dougherty Jr. et al is respectfully traversed. Dougherty's composition consists essentially of trifluoromethane (col. 2, lines 65-68). The amendments to claims 1, 5 and 10 expressly exclude trifluoromethane. The volume % of inhibiting agent is also specified. In response to the examiner's statement on the top of page 6 of the Office Action, that the claim recitation of less than 1% by volume reads on

zero, these claims have been amended to recite “up to less than...”. Therefore, reconsideration and withdrawal of this ground of rejection is respectfully requested.

As discussed in the Amendment filed on September 26, 2003 on pages 13 to 14, Dougherty discloses a trifluoromethane composition to prevent and/or extinguish fire. Applicants’ claimed composition does not include trifluoromethane, and molten magnesium/magnesium alloy is not disclosed in Dougherty. The flammable materials disclosed in Dougherty are paper, cloth, wood, flammable liquids, and plastic items (column 3, lines 64-68). There is no disclosure or suggestion in Dougherty of a non-trifluoromethane containing cover gas composition adapted for the protection of molten magnesium/magnesium alloy.

Since trifluoromethane has an extremely low boiling point and a high vapor pressure, it acts as a propellant for fire extinguishers (column 4, lines 18-21). As the propellant, the trifluoromethane in Dougherty comprises from 0.5 weight percent to 99 weight percent of the composition. When trifluoromethane acts as its own propellant, it comprises 100% of the propellant extinguisher mixture (column 4, lines 31-38). In contrast, cover gas compositions are implemented in the form of constant, small quiescent flows of gas to prevent magnesium vaporization, and applicant’s claimed composition does not contain trifluoromethane.

The examiner's reference to Examples 1 and 5 in Dougherty are not relevant because each example relates to fire extinguishing compositions wherein the active agent is present in about 8.7-23.8 volume %. This amount is over 800 volume % greater than the largest concentration of non-trifluoromethane containing inhibiting agent in the cover gas compositions claimed by applicants.

Moreover, the examiner's position is even more untenable in view of his admission that Dougherty does not disclose a cover gas for molten magnesium. See July 2, 2003 Official Action, page 3, last 2 lines. Therefore, reconsideration and withdrawal of this ground of rejection is respectfully requested.

The rejection of claims 1-8, 10-12 and 33 under 35 USC 103 as unpatentable over PCT Publication WO91/02564 is respectfully traversed.

Claims 1-8, 10-12 and 33 recite non-trifluoromethane containing cover gas compositions containing less than 1 volume % of fluorine inhibiting agent. As discussed in the arguments presented in applicants previous Amendment filed September 26, 2003, WO 91/02564 is restricted to fire extinguishing. WO 91/02564 discloses the use of blends of hydrofluorocarbons and other fire extinguishing agents to rapidly extinguish fires (page 2, line 25 to page 3, line 1). The concentration of the fluorinated fire extinguishing agents varies from about 3-15 volume %, preferably 5-10 volume % (page 4, lines 22-25). The hydrofluorocarbons are present at a level of at least 10% by weight of

the blend (page 5, lines 33-36 and page 6, lines 22-36).

All the examples in WO 91/02564 relate to fire extinguishing compositions. The volume of fire extinguishing agent ranges from 2.4 volume % to 14.1 volume %. This is more than 240% greater than the fluorine containing inhibiting agent in applicants' cover gas composition which has less than 1% volume of the total composition.

Moreover, the examiner's position is even more untenable in view of his admission that WO 91/02564 does not disclose a cover gas composition adapted for the protection of molten magnesium/magnesium alloy. See July 2, 2003 Office Action page 3, last two lines.

The rejection of claims 1-12 and 33 under 35 USC §103 as unpatentable over the previously relied upon WO 96/22129, Dougherty et al and WO 91/02564 further in view of U.S. Patent 6,167,944 to Ricketts et al is respectfully traversed.

Applicants have already discussed in detail the significant individual deficiencies of WO 96/22129, Dougherty et al and WO 91/02564. Moreover, as noted, the examiner has admitted that these references do not disclose a cover gas composition for molten magnesium/magnesium alloy. The combination of these references only compounds the deficiencies of each reference. These deficiencies are further compounded by the examiner's reliance on U.S. Patent 6,167,944 to Ricketts et al.

Ricketts et al discloses a method and system for ingot mold casting of metals and the use of an inert protective gas supplied to the space where the casting occurs. The inert gases include nitrogen, argon or a mixture of nitrogen and argon, a dilute sulfur hexafluoride/air mixture, dilute sulfur hexafluoride/carbon dioxide mixture or a combination of air, carbon dioxide and sulfur hexafluoride (column 4, lines 50-58).

The disadvantages of sulfur hexafluoride as a cover gas composition have already been discussed on page 17 of the Amendment. In essence, when used as a cover gas, sulfur hexafluoride can be corrosive and react explosively with molten magnesium.

Ricketts et al do not disclose or suggest a non-trifluoromethane containing cover gas composition having up to less than 1% by volume of a fluorine containing inhibiting agent adapted for the protection of molten magnesium/magnesium alloy.

Moreover there is no incentive in Ricketts or any of the other prior art relied upon by the examiner to collectively suggest the claimed invention. It is respectfully submitted that a rejection of this type is at best based on selective hindsight reconstruction using applicant's claimed invention as a guide. The conclusions made by the examiner are not suggested in an obvious manner by the combination of references. Therefore, reconsideration and withdrawal of this ground of rejection is respectfully requested.


The examiner's additional reliance upon In re Boesch, 205 USPQ 215 does not resolve the deficiencies of the rejection. Boesch holds that discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. That is not the situation here. The references relied upon by the examiner, individually or in combination do not provide a *prima facie* basis for rejection. Therefore, the examiner's reliance on Boesch appears to be inappropriate.

Lastly, the examiner states at the bottom of page 7 of the Office Action that U.S. Patent No. 6,537,346 to Milbrath is prior art. Applicants respectfully disagree. If the examiner continues to maintain that Milbrath is prior art, an explanation of the reasons for this conclusion is respectfully requested. Applicants' position is that the subject patent application antedates the Milbrath patent as a reference.

It is respectfully submitted that claims 1-12, and 33-51 are now in condition for allowance and such favorable action is respectfully solicited.

Respectfully submitted,

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